Elytroderma Needle Cast

Perennial, compact brooms in pines

Pathogen—Elytroderma needle cast is caused by the fungus *Elytroderma deformans*.

Hosts—The disease is most severe on ponderosa pine, but lodgepole pine, jack pine, and pinyon pine are also susceptible.

Signs and Symptoms—Perennial infections on vigorous branches often cause small to large compact brooms with upward turning branches and many dead, straw-colored needles. This is the only needle cast that is perennial in host twigs.

The fungus invades twigs and branches, causing stunting of needles, reddened foliage, defoliation, and conspicuous blooming (figs. 1-2). Brown, resinous lesions often develop in the phloem of infected twigs (fig. 3). Infected needles are red-brown, becoming pale over the summer, but the basal portion (1/4-3/8 inch [6-10 mm]) remains green. Fruiting bodies appear near the base of dead and dying needles in the spring and are thin, elongated (approximately 1/2 inch [13 mm] long), and dull black (fig. 4). Brooms are compact, globose, and contain discolored needles, most of which are shed by fall.

Dwarf mistletoe brooms on pines sometimes look similar to Elytroderma brooms. However, dwarf mistletoe plants or remnant basal cups should be visible on dwarf mistletoe infections and Elytroderma brooms are more compact and globose.

Disease Cycle—Airborne spores infect needles in late summer and fall and occasionally in spring, following rainstorms. When free moisture is available, spores germinate and penetrate young needles. The fungus grows within the needle tissue and eventually invades twigs and becomes systemic within the host, infecting new shoots and needles each year. The following spring, infected needles turn reddish brown, and by early summer, fungal fruiting bodies develop on dead needles if conditions are conducive. These fruiting bodies, which appear as black, elongated lines or slits, split open during wet weather and release spores.

Impact—Impacts are greatest in areas with moist environmental conditions such as drainages. Dry spring weather tends to suppress spore production and infection. Infection is favored by dense stand conditions and injury is greatest on poor crowns. Elytroderma needle cast is more common and damaging in the northern Rockies than in the southern and central portions of the range. The disease is occasionally found in the Colorado Front Range, but damage in the Rocky Mountain Region is greatest on ponderosa pine in the Black Hills of South Dakota. Infection results in loss of the previous year's

Figure 1. Large, compact witches' broom typical of Elytroderma disease on ponderosa pine. *Photo: Thomas R. Erikson, USDA Forest Service.*

Figure 2. A perennial infection on ponderosa pine with upward-turning branches. *Photo: USDA Forest Service Archive, Bugwood.org.*

Figure 3. Necrotic, resinous flecks are often visible in the inner bark of infected twigs. *Photo: John Schwandt, USDA Forest Service, Bugwood.org.*

Figure 4. Black, elongated fruiting bodies appear in the spring near the base of needles. *Photo: John Schwandt, USDA Forest Service, Bugwood.org.*

needles and death of branch cambium. Stem infections can severely damage and deform small trees. When infection is severe, growth loss occurs and entire tree tops may be deformed. Severely infected trees may be weakened, predisposing them to attack by bark beetles or other damages, or killed outright.

Management—In young stands, damage can be reduced by maintaining good spacing through thinning. Selectively remove moderately and severely infected trees and trees with infections high in the crown. Accelerated logging in heavily infested mature stands not only serves to salvage valuable timber but also prevents the establishment of secondary pests. Remove all trees with more than one-quarter of their twigs killed.

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1. Childs, T.W.; Shea, K.R.; Stewart, J.L. 1971. Elytroderma disease of ponderosa pine. Forest Pest Leaflet 42. U.S. Department of Agriculture, Forest Service. 6 p.

2. Sinclair, W.A.; Lyon, H.H.; Johnson, W.T. 1987. Diseases of trees and shrubs. Ithaca, NY: Cornell University Press. 574 p.